

of a loose texture also, and, according as the cold strikes inwards from the bottom and sides, are quenched, as it were, and made rigid in that very posture wherein the cold finds them. For the parts of the *crust* being already hardened, will not suffer the parts to shrink any more from the outward Surface inward; and though it shrink a little by reason of the small parcels of some Aerial substances dispersed through the matter of the Glas, yet that is not neer so much as it appears (as I just now hinted;) nor if it were, would it be sufficient for to consolidate and condense the body of Glas into a *tuff* and close texture, after it had been so excessively rarified by the heat of the glas-Furnace.

But that there may be such an expansion of the aerial substance contained in those little *blebbs* or bubbles in the body of the drop, this following Experiment will make more evident.

Take a small Glas-Cane about a foot long, seal up one end of it *hermetically*, then put in a very small bubble of Glas, almost of the shape of an Essence-viol with the open mouth towards the sealed end, then draw out the other end of the Pipe very small, and fill the whole Cylinder with water, then set this Tube by the Fire till the Water begin to boyl, and the Air in the bubble be in good part rarified and driven out, then by sucking at the smalling Pipe, more of the Air or vapours in the bubble may be suck'd out, so that it may sink to the bottom; when it is sunk to the bottom, in the flame of a Candle, or Lamp, nip up the slender Pipe and let it cool: whereupon it is obvious to observe, first, that the Water by degrees will subside and shrink into much less room: Next, that the Air or vapours in the Glas will expand themselves so, as to buoy up the little Glas: Thirdly, that all about the inside of the Glas-pipe there will appear an infinite number of small bubbles, which as the Water grows colder and colder will swell bigger and bigger, and many of them buoy themselves up and break at the top.

From this *Disfeeding* of the heat in Glas drops, that is, by the quenching or cooling Irradiations propagated from the Surface upwards and inwards, by the lines CT, CT, DT, DE, &c. the bubbles in the drop have room to expand themselves a little, and the parts of the Glas contract themselves; but this operation being too quick for the sluggish parts of the Glas, the contraction is performed very unequally and irregularly, and thereby the Particles of the Glas are bent, some one way, and some another, yet so as that most of them draw towards the Pith or middle TEE E, or rather from that outward: so that they cannot *extricate* or unbend themselves, till some part of TEE E be broken and loosened, for all the parts about that are placed in the manner of an Arch, and so till their hold at TEE E be loosened they cannot fly asunder, but uphold, and shelter, and fix each other much like the stones in a Vault, where each stone does concur to the stability of the whole Fabrick, and no one stone can be taken away but the whole Arch falls. And where-soever any of those radiating wedges DT D, &c. are removed, which are the component parts of this Arch, the whole Fabrick presently falls to pieces;

pieces; for all the Springs of the several parts are immediately extricate themselves and fly asunder even by its spring contributing to the darting of it self and the other part. But if this drop be heat so hot as that the parts unbend themselves, and be settled and annealed in that posture, then suffered gently to subside and cool; The parts springing their springiness, constitute a drop of a more firm texture, and the parts being not at all under a flexure, the middle or Pith TEE E be broken, yet will not the drop break as before.

This Conjecture of mine I shall endeavour to maintain by proving each particular Assertion with *analogous* Experiments, which are these.

First, That the parts of the Glas, whilst in a hot posture, are more rarified, or take up more room, than when they are cold.

Secondly, That the parts of the drop do suffer contraction.

Thirdly, That the dropping or quenching the drop in Water makes it of a hard, springing, and rarified texture.

Fourthly, That there is a flexion or force remaining in the Glas thus quenched, from which they incline to unbend themselves.

Fifthly, That the Fabrick of the drop, that is about to be broken, from extricating themselves, is *analogous* to that of an Arch.

Sixthly, That the sudden flying asunder of the drop is owing to their springiness.

Seventhly, That a gradual heating and cooling of the drop makes the parts of Glas to a texture that is more loose, and more pliant, but not so brittle.

That the first of these is true may be gathered from the property of a body arising from the motion or agitation thereof; therefore whatever body is thereby toucht must necessarily be shaken by that motion, whereby its parts will be shaken by degrees free and extricate themselves from one another. Thus Air included in a bladder, by being heated will burst it to pieces. Thus have I broken a bladder over the fire in my hand, with such a violence and noise, as made me deaf for the present, and much surpassed the noise of a gun. The like have I done by throwing into the fire a small bladder hermetically sealed, with a little drop of Water included in it. Water also, or any other Liquor, included in a conveyance thus warmed, manifestly expands it self with a very great force, and will break the strongest vessel, if when heated it be narrow.